Abstract Submitted
for the OSF07 Meeting of
The American Physical Society

High resolution optical imaging of single nanostructures for optical spectroscopy[1] JOSHUA NOHLE, MELODIE FICHENSCHER, HOWARD JACKSON, LEIGH SMITH, University of Cincinnati, JAN YARRISON-RICE, Miami University, Y.-J. CHOI, K.-J. CHOI, J.-G. PARK, Korea Institute of Science and Technology — We have fabricated two types of solid immersion lenses (SIL) to significantly increase the optical spatial resolution of a microscope objective. In the first type, we grind and polish a single 5 mm BK7 sphere to a hemisphere and directly image small 300 and 900 nm polystyrene spheres on the flat part of the hemisphere to show that the optical resolution of a 0.5NA microscope objective changes from 1 micron in air to 0.6 microns with the SIL. To gain more flexibility, we replace the hemisphere with two separate parts: the first part is a 1 mm microscope slide made of BK7, and the hemisphere is completed by placing a 1.5 mm thick truncated section of a 5 mm diameter BK7 sphere. In this way, the truncated SIL can be moved across the surface of the microscope slide allowing a number of different nanostructures to be directly imaged across the back of the microscope slide. As a final test of this technique, we directly image Raman scattered light from a 3 x 30 micron CdS nanosheet which is 50 nm thick.

[1]Supported by NSF grant ECCS 0701703

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Date submitted: 28 Sep 2007 Electronic form version 1.4